INSTRUCTION BOOK
Model 202

H. F. BARRETTER

Measurements Corp. Boonton, N. J.

MP MASTER
MA24306

OPERATING INSTRUCTIONS
for
H.F. BARRETTER - MODEL 202

MEASUREMENTS CORPORATION BOONTON, NEW JERSEY

Description

The Model 202 High Frequency Barretter is a portable instrument for the precise measurement of radio frequency signal generator output. When operated in accordance with the instructions given below it provides the most accurate standardization of high frequency voltage available at the present time.

Characteristics

Voltage Range	-	20K to 120K microvolts (.02 to .12 rms volts)
Frequency Range	-	2 mc. to 400 mc.
Input Impedance	-	50 ohms
Accuracy	-	5%
Power Source	-	110-120 volt, 60 cycle a.c.
Power Comsumption	-	25 watts
Fuse Protection	-	one 3AG 1/2 ampere
Dimensions	-	Width 13"; Height 10-3/4"; Depth 7½"
Weight	-	20 pounds

TEST EQUIPMENT

WARNING:

Permanent damage to this instrument may result if more than ½ volt, either a.c. or d.c., is applied to the input jack. When connecting the Model 202 to signal generators, make certain that no surges can occur and that no d.c. component is present at the point of connection.

To Operate

1. Connect the line plug to a source of 100-120 volt, 60 cycle power. The green pilot light will glow with the power switch either on or off, indicating that the thermostatically controlled oven is warming up.

2. Flip the power switch to "on" to provide power for the Barretter Bridge and its amplifier circuits, as indicated by glowing of the red pilot light.

3. While the H.F. Barretter is warming up (for about one hour) arrange connections which will meet the following requirements.

a. The voltage at the input jack of the Model 202 must not exceed ½ rms volt across the 50 ohm load.

b. The coaxial connecting cable must have a characteristic impedance of 50 ohms. It should terminate in a Navy type #49268 connector, or equivalent.

c. The d.c. resistance looking back into the transmission cable, when connected to the signal source, must not exceed 100 ohms.

d. The signal must be completely eliminated (such as by turning off power to the signal equipment) before connection is made to the H.F. Barretter.

e. The level of the unmodulated R.F. voltage must lie between 20K and 120K microvolts (.02 to .12 rms volts).

4. The Model 202 is ready for use when the green pilot light starts to blink on and off. This indicates that the thermostat is holding the oven to the temperature at which the instrument is calibrated.

5. Throw switch at lower left of Microvolt Dial to CHECK ZERO. This performs the same function as turning the Microvolt Dial to zero.

6. With all connections made, but no applied signal, set the galvanometer pointer to the red center mark by means of the knob located above the galvanometer. If pointer will not come to center, the d.c. resistance across the output of the transmission cable should be investigated. This resistance should not exceed 100 ohms, as measured between the center conductor and shield of the Navy type #49268 connector.

7. Throw switch to USE. Apply the unmodulated R.F. signal to be measured. Bring the galvanometer pointer to center by rotating the Microvolt Dial. The value read from this dial, after applying the frequency correction factor, gives the true voltage across the Barretter Input Jack. NOTE: All modulation should be eliminated from the signal generator output. The Model 202 is an rms device and cannot be used for the measurement of an amplitude modulated carrier.

8. The Model 80 output metering system has the same output vs. frequency characteristic as the Model 202 barretter. The Model 80 output is set up using no correction for frequency, and therefore should be checked in the same manner.

9. Provision has been made for checking the Barretter calibration at the 100K point. This is to be done with zero input voltage. Set zero as indicated under 5 and 6. Throw switch to USE, and depress CHECK button at upper left of meter. Bring the galvanometer pointer to center by rotating the Microvolt Dial. The dial should now read 100K ±2%.

The purpose of this check is to determine whether circuit constants or bolometer characteristics have changed, in which case the Barretter should be returned for servicing.

Operating Principle

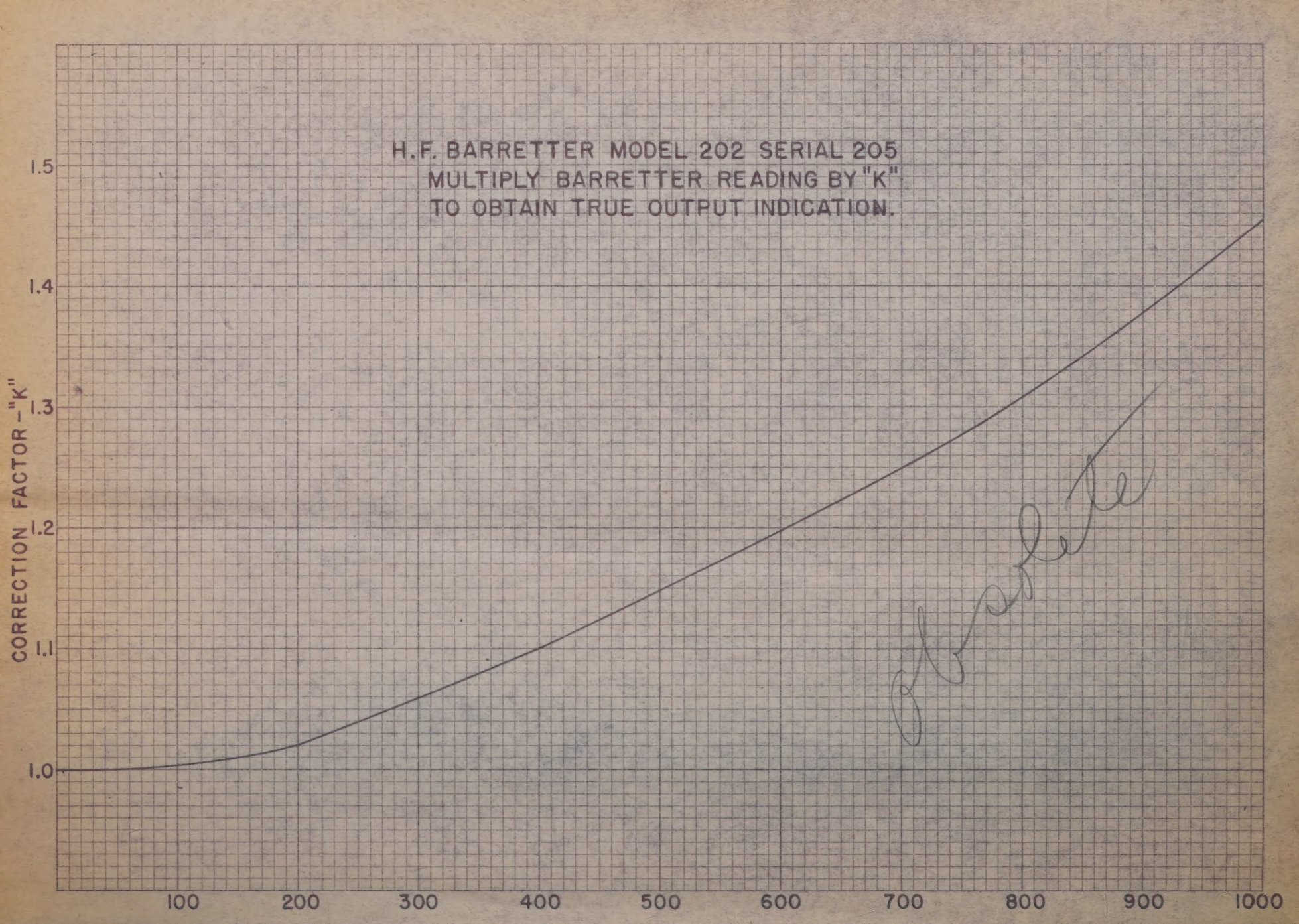
This instrument operates by unbalancing a Wheatstone bridge, due to passage of radio frequency current through a fine platinum filament known as a "Bolometer". The amount of adjustment of a calibrated potentiometer required to restore bridge balance is an accurate measure of R.F. power in the

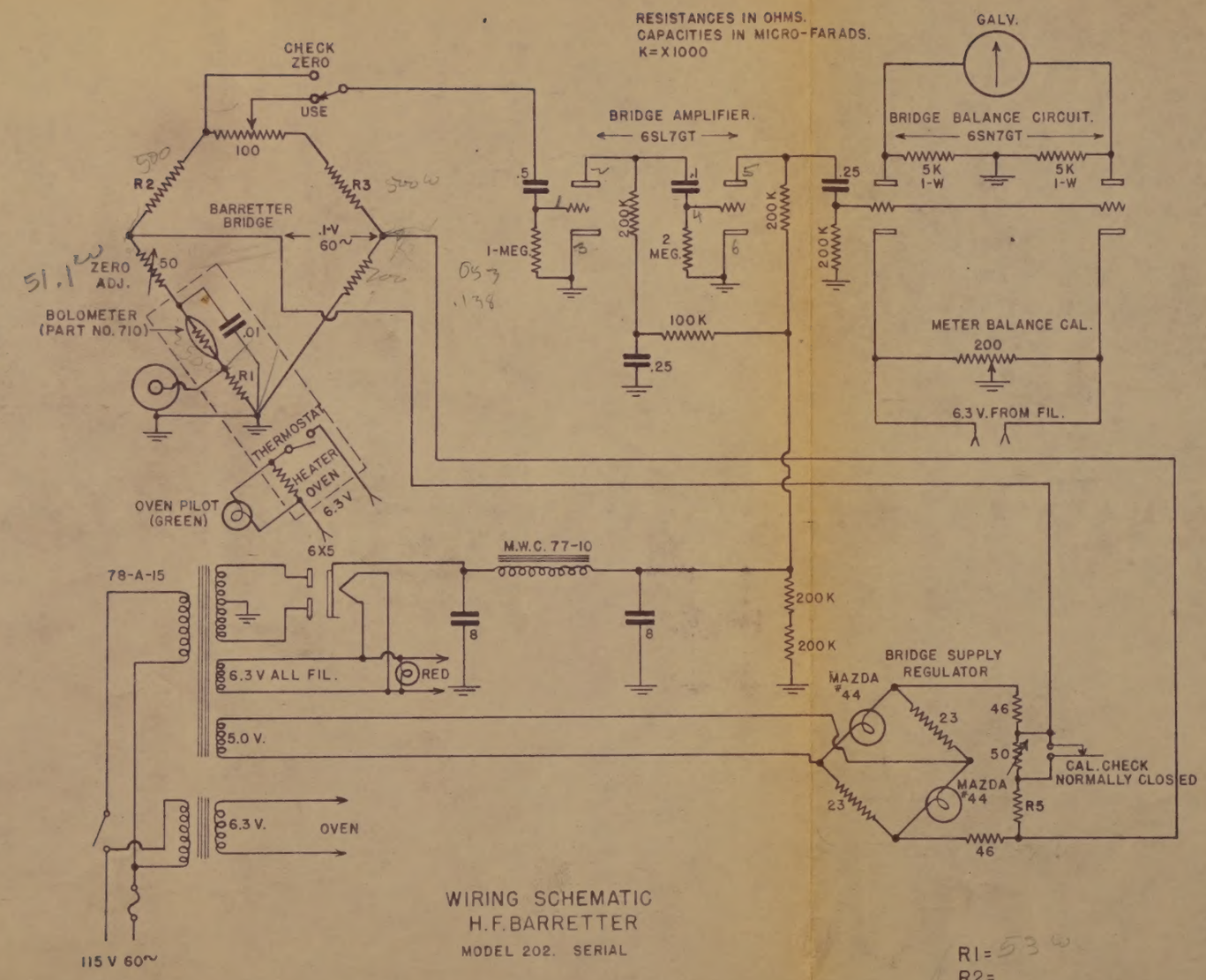
bolometer element. The potentiometer is calibrated in terms of rms microvolts, since the R.F. power is always dissipated in a fixed impedance of 50 ohms.

The Bolometer consists of a .0001 inch diameter platinum filament in a small, highly evacuated glass envelope. The resistance of this element is a direct function of its temperature which, in turn, will be affected by the passage of electric current through it. To eliminate other sources of temperature variation the Bolometer is contained in a thermostatically controlled electric oven.

The entire bridge, of which the Bolometer forms a part of one arm, is termed a Barretter, and is driven by a regulated source of 60 cycle a. c. voltage. A unique a.c. bridge amplifier and indicating circuit increases the sensitivity of the system in its response to unbalance potentials across the Barretter Bridge. This permits the use of a simple, rugged type of galvanometer. The galvanometer is automatically protected against excessive unbalance voltages by the overload characteristic of the indicating circuit.

NOTICE: Though the Model 202 was designed primarily for the output calibration of low power signal generators it is still in process of development and other applications may be found. However, the Engineering Department of the Measurements Corporation should be consulted before attempting to connect this instrument to other types of radio equipment.


H.F. BARRETTER MODEL 202 SERIAL 205
MULTIPLY BARRETTER READING BY "K"
TO OBTAIN TRUE OUTPUT INDICATION.
CORRECTION FACTOR - "K"
1.5
1.4
1.3
1.2
1.1
1.0
100
200
300
400
500
600
700
800
900
1000



WIRING SCHEMATIC
H.F. BARRETTER
MODEL 202. SERIAL

R1= 53 Ω
R2=
R3=
R4=
R5= 25 W

Resis at output jack 64.5 Ω

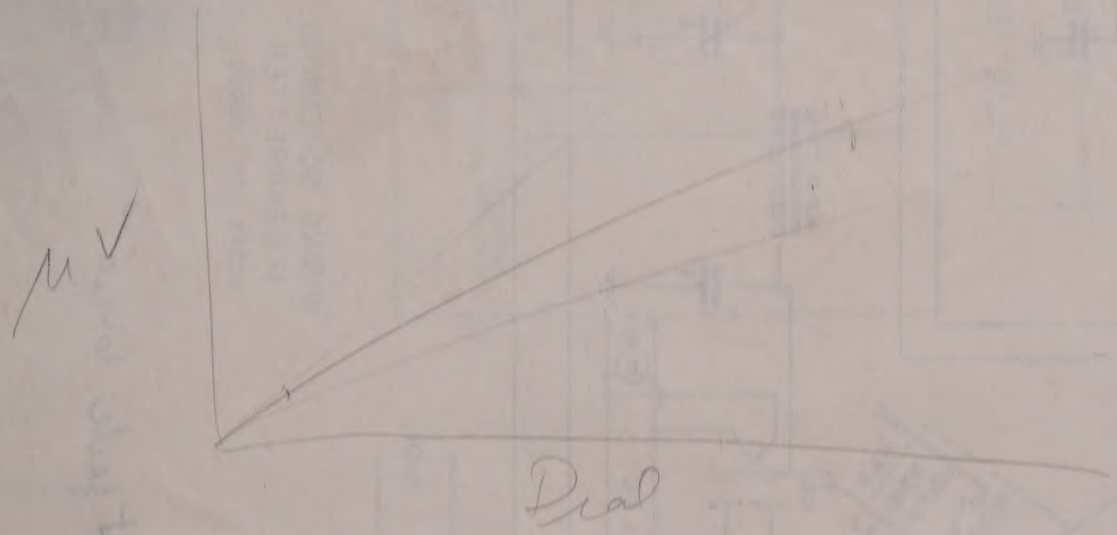
REV.	REASON	DAT
C	Rem. ck. zero resistor, VR-1 ...	
B	Replaced values by ...	
	Desig. for R1,2,3,4,5,	

MEASUREMENTS CORP.
BOONTON-NEW JERSEY

DWN. BY	CHK. BY
SCALE	DATE 3-13-45

TOLERANCE
FRACTIONAL DIMENSIONS ± .010
DECIMAL DIMENSIONS ± .005
HOLES ± .002
UNLESS OTHERWISE SPECIFIED

DWG. No. B356-C


μV
Dial

MP MASTER
MA24306